



TECHNICAL  
PRESS INFORMATION  
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PART IV

TESTS AND OPERATIONAL PLANS

In order to properly expedite performance testing, all scheduled tests are divided into two categories: namely, standard marine equipments and systems, and nuclear equipments and systems.

The standard marine equipment and systems will be tested by authority of test procedures approved by Maritime Administration and other regulatory bodies, these tests will be conducted by the New York Shipbuilding Corporation (NYSC) and witnessed and evaluated by inspectors of various regulatory agencies.

The nuclear equipment and systems category has been subdivided into six successive test phases to provide the ultimate in testing and operational safety in conformance with requirements of the Atomic Energy Commissions Advisory Committee on Reactor Safeguards.

In order to regulate every facet of proposed testing and operation, the Combined Test Committee (CTC) was formed, with membership from the Maritime Administration and the Atomic Energy Commission (MARAD-AEC), Babcock and Wilcox Company (B&W), States Marine Lines Company (SML), and NYSC. It is the express function of the CTC to approve all test specifications and subsequent test procedures; evaluate all test data; authorize performance of tests and operations of succeeding phases; and compile the final test and performance report.

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All nuclear equipment and systems testing will be guided by test specifications written by B&W and approved by the CTC. The subsequent test procedures will be written by a sub-committee of the CTC, and approved by the CTC before being put into effect. The test specifications and procedures will describe and define the purpose, functional design requirement, test prerequisites, test procedure, data required, test conditions and required test equipment, test check-off, design restrictions, safety precautions, and equipment and personnel hazards that must be considered.

All testing and operational procedures will be accomplished by trained personnel from B&W, SML, and NYSC, under the direct supervision of NYSC. Because of the safeguards requirements and the intricate technical nature of the reactivity tests and operations, and the interdependence of the reactor and associated components and systems, a strict control of the functions of all test and operating personnel will be maintained.

The specific test phases are as described below. The tests included in each phase are a function of the construction status of the various equipment items and systems and are arranged to attain sequential testing and data. All tests of a previous phase must be completed successfully before succeeding phase testing is authorized by the CTC.

#### PHASE I - PRE-OPERATIONAL INTEGRITY TESTING

Tests identified with this phase will be conducted on the power plant components and systems to verify thermal and hydraulic design, perform hydrostatic strength testing, perform system flushing and

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cleanliness tests, calibrate non-nuclear instrumentation and verify proper installation and operation of manual and automatic controls.

The objective of this phase will be to assure proper equipment installation and erection and to prepare the plant for operational testing, and cover the following on-site functions: (1) receiving, (2) inspection of equipment prior to and following installation, (3) inspection of welds, (4) hydrostatic testing, (5) systems clean-up, (6) piping and wiring continuity, and (7) equipment alignment.

#### PHASE II - PRE-CRITICAL SYSTEMS TESTING

Tests identified with this phase are to be conducted to determine functional reliability of the nuclear power plant before authorization can be obtained for loading the reactor vessel with the fuel core. During this phase the nuclear plant equipment and systems will be operated at rated pressure and temperature using a supplementary heat source. Tests will cover such items as: (1) fluid system leak tests; (2) operation of rotating or reciprocating equipment; (3) operation of systems at temperature and pressure to determine integrity and operating characteristics; (4) check of operating procedures (filling, draining, start-up, running, shutdown); and (5) instrumentation check and preliminary calibration at operating temperature, pressure and flow.

Upon successful completion of this phase, including nuclear instrumentation calibration, the fuel core will be loaded into the reactor vessel. Core loading is expected in the Spring of 1960.

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### PHASE III - INITIAL CRITICAL AND ZERO POWER TESTING

Following the installation of the fuel core, the objective will be to prove out satisfactory operation of the reactor plant at zero power, independent of the propulsion system. This phase will include: (1) determination of reactor core data, (2) preliminary calibration of nuclear instrumentation, (3) operational tests of control rod mechanisms, (4) flow characteristics of primary coolant system, (5) complete testing of reactor safety and control systems, (6) criticality and lower power operation, and (7) check power plant manual low-power operating procedures. First criticality is expected to be achieved during the late Spring of 1960.

### PHASE IV - POWER OPERATION AT DOCKSIDE

During this phase the entire power plant will be operated under steady state and transient conditions as determined by the maximum horsepower permissible for transmission to the ship's propeller while the ship is secured to the dock.

These tests will verify that all equipment, components, and systems are capable of safe and reliable sustained operation, and will be the basis for authorization of sea trials. In addition, this phase of testing will permit evaluation of maintenance and operating procedures and will provide opportunity to familiarize the vessel's operating personnel with the propulsion plant.

### PHASE V - SEA TRIALS

During the Summer of 1960, the vessel will be taken to sea and subjected to extensive trials and operating tests up to maximum full power to demonstrate reliable operation under seagoing conditions.

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#### PHASE VI - DEVELOPMENTAL OPERATION

On completion of sea trials, the ship will be placed in limited commercial operation, carrying cargo and passengers on a non-scheduled basis. At the same time, as part of the ship's 'floating laboratory' function, operating data will be developed and analyzed as a guide to the ship's full commercial operation and to the evolution of future nuclear merchant ships. During this phase, which is expected to last about two years, it may be necessary to conduct adjustment and calibration tests similar to those of earlier phases. To broaden operating experience, some components may be replaced as developed or experimental models become available.